Listing of Claims

Claims 1-48 (canceled)

Claim 49 (currently amended): The apparatus of claim [44] 59, wherein the additive consumption inhibiting aldehyde comprises from about 0.001 g/L to about 100.0 g/L of the bath.

Claim 50 (currently amended): The apparatus of claim [44] 59, wherein the metal plating bath further comprises brighteners, levelers, hardeners, wetting agents, malleability modifiers, ductility modifiers, deposition modifiers, or suppressors.

Claim 51 (currently amended): The apparatus of claim [44] 59, wherein the pH of the metal plating bath is from 0 to about 8.0.

Claim 52 (currently amended): The apparatus of claim [44] 59, wherein the metal salt comprises copper halides, copper sulfate, copper alkane sulfonate, copper alkanol sulfonate, or mixtures thereof.

Claim 53 (currently amended): The apparatus of claim [44] 59, wherein the insoluble anode comprises metals of cobalt, nickel, ruthenium, rhodium, palladium, iridium, or platinum.

Claim 54 (original): The apparatus of claim 53, wherein the insoluble anode further comprises metals of titanium, zirconium, hafnium, vanadium, niobium, or tantalum.

Claim 55 (original): The apparatus of claim 54, wherein the insoluble anode further comprises metals of beryllium, calcium, strontium, barium, scandium, yttrium, lanthanum, or rare earth elements.

Claim 56 (currently amended): The apparatus of claim [44] 59, wherein the insoluble anode comprises iridium dioxide.

Claim 57 (currently amended): The apparatus of claim [44] 59, wherein the cathode comprises a wiring board, an integrated circuit, an electrical contact surface, a connector, an electrolytic foil, a silicon wafer, a semiconductor, a lead frame, an optoelectronic component, a solder bump, a decorative article, or a sanitary appliance [and the like].

Claim 58 (currently amended): The apparatus of claim [44] 59, wherein the insoluble anode and the cathode have a current density of [from] about 1 to about 1000 amps/ft^2.

Claim 59 (new): An apparatus for electroplating a substrate comprising an electrical power source electrically connected with an insoluble anode and a cathode such that an electrical current can pass through the insoluble anode and the cathode, the insoluble anode and the

cathode are in contact with a metal plating bath comprising and additive consumption inhibiting aldehyde with a formula:

$$R^1\text{-CHO}$$

where R^1 is (C_1-C_{20}) linear, branched or cyclic alkyl; (C_2-C_{20}) linear or branched alkenyl; (C_2-C_{20}) linear or branched alkynyl; (C_1-C_{20}) alkyl-O(C_2-C_3O)$_x$$R^2$; ($C_1$-$C_{12}$) alkylphenyl-O($C_2$-$C_3O$)$_x$$R^2$; or phenyl-O($C_2$-$C_3O$)$_x$$R^2$; where x is an integer of 1-500 and R^2 is hydrogen, (C_1-C_4)alkyl, or phenyl; the (C_1-C_{20})alkyl, (C_2-C_{20})alkenyl and (C_2-C_{20})alkenyl may be substituted or unsubstituted; and a salt of a metal selected from the group consisting of copper, silver, palladium, platinum, cobalt, chromium, bismuth, indium, rhodium, iridium and ruthenium; and one or more brighteners having formulas: HO_3SR^{11}-SH, HO_3S-R^{11}-S-S-R^{11}-SO_3H and HO_3S-Ar-S-S-Ar-SO_3H, where R^{11} is C_1-C_6 or an aryl group and Ar is phenyl or naphthyl.

Claim 60 (new): The apparatus of claim 59, wherein the (C_1-C_{20})alkyl, (C_2-C_{20})alkenyl and the (C_2-C_{20})alkynyl are substituted with one or more substituents comprising halogen aryl, -SH, -CN, silyl, silane, -SCN, -C=NS, -Si(OH)$_3$, -NO_2, -SO_3M, -PO_3M, -P(R)$_2$, -OH, -COOH, -CHO, -COO(C_1-C_{12})alkyl, -CO(C_1-C_{12})alkyl, or NR^3R^4, where R^3 and R^4 are independently hydrogen, aryl, or (C_1-C_{12})alkyl; and M is hydrogen, or alkali metal, and R is hydrogen or halogen.

Claim 61 (new): An apparatus for electroplating a substrtate comprising an electrical power source electrically connected with an insoluble anode and a cathode such that an electrical current can pass through the insoluble anode and the cathode, the insoluble anode and the cathode are in contact with a metal plating bath comprising 2,3,4-trihydroxybenzaldehyde, 3-hydroxybenzaldehyde, 3,4,5-trihydroxybenzaldehyde, 2,4-dihydroxybenzaldehyde, 4-hydroxy-3-methoxycinnamaldehyde, 3,4,5-trihydroxybenzaldehyde monohydrate, syringealdehyde, 2,5-dihydroxybenzaldehyde, 2,4,5-trihydroxybenzaldehyde, 3,5,-hydroxybenzaldehyde, 3,4-dihydroxybenzaldehyde, 4-hydroxybenzaldehyde, 4-carboxybenzaldehyde, furaldehyde or mixtures thereof; a salt of a metal selected from the group consisting of copper, silver, palladium, platinum, cobalt, chromium, bismuth, indium, rhodium, iridium and ruthenium; and one or more brighteners having formulas: HO_3S-R^{11}-SH, HO_3S-R^{11}-S-S-R^{11}-SO_3H and HO_3S-Ar-S-S-Ar-SO_3H, where R^{11} is C_1-C_6 or an aryl group and Ar is phenyl or naphthyl.